1993-94 SESSION COMMITTEE HEARING RECORDS

Committee Name:

Joint Committee For Review of Administrative Rules (JCR-AR)

Sample:

Record of Comm. Proceedings ... RCP
- 05hrAC-EdR_RCP_pt01a
- 05hrAC-EdR_RCP_pt01b
- 05hrAC-EdR_RCP_pt02

- *Appointments ... Appt*
- **

- *Clearinghouse Rules ... CRule*
- *93hrJCR-AR_CRule_93-188_pt04*

- *Committee Hearings ... CH*
- **

- *Committee Reports ... CR*
- **

- *Executive Sessions ... ES*
- **

- *Hearing Records ... HR*
- **

- *Miscellaneous ... Misc*
- **

- *Record of Comm. Proceedings ... RCP*
- **

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December 8, 1997

Via Facsimile (608)267-2871 and U.S. Mail

The Honorable Rodney C. Moen
State Senator
P. O. Box 7882
Madison, WI 53707-7882

Dear Senator Moen:

I am co-counsel with City Attorney Curt R. Meitz and Harold H. Fuhrman, Esq. in representing the City of Waukesha and the Waukesha Water Utility in matters relating to radium in its drinking water.

The matter of regulating radium and other radionuclides in drinking water is the subject of a rulemaking proceeding that was initiated by the EPA in 1991. Hearings were held in Washington, D.C. and Chicago, Illinois in regard to that rulemaking whereby the EPA proposed to change the maximum contaminant level for radium 226 and radium 228, combined in drinking water from 5pCi/1 to 20 pCi/1 as to each isotope. Final action has not yet been taken on this matter by the EPA although it has scheduled a "meeting of stakehol ders" in Washington, D.C. on December 11th and 12th, 1997 which Attorney Fuhrman and our scientific consultant, Dr. Rowland, plan on attending on behalf of the City of Waukesha and the Waukesha Water Utility.

In the meantime, the Department of Natural Resources (DNR) and the Department of Health and Social Services (n/k/a Department of Health and Family Services) are proposing administrative rule changes which would establish a standard of 5 pCi/1 of groundwater for radium 226 and radium 228, combined. The existing standard for drinking water. The City of Waukesha and its Water Utility have opposed this change by appearing at a public hearing that was held in Waukesha earlier this year. At that time the City of Waukesha and its Water Utility presented the testimony of Dr. Robert Rowland.

MICHAEL BEST & FRIEDRICH LLP
Attorneys at Law

Notwithstanding the testimony of Dr. Rowland, as well as the testimony of Mayor Carol Opel of the City of Waukesha, the proposed standard for groundwater for radium 226 and radium 228 at 5 pCi/l has now been formally recommended to the two houses of the Wisconsin Legislature for adoption. By this letter, we are responding to the material transmitted to you by Paul E. Menge, Administrative Rules Manager, the response setting forth the position of the City of Waukesha and the Waukesha Water Utility.

On behalf of Mayor Carol Opel of the City of Waukesha, we hereby request a hearing on this proposed rule before the legislature takes action. Specifically, I am requesting a hearing on this matter before action by your legislature committee or before action is taken by either house of the legislature. Within the near future, Attorney Furhman plans to file with you a more detailed position paper setting forth the objection of the City of Waukesha and the Waukesha Water Utility to the proposed Administrative Rules. The purpose of this letter is to alert you to the fact that the City of Waukesha and its Water Utility consider this matter very serious for the reasons which will be set forth in the position paper. We expect to deliver the paper in about two weeks.

In regard to the requested hearing, we propose to have Dr. Rowland give testimony. As stated above, he will be giving testimony before the EPA in Washington on December 11th and 12th. However, he will be out of the country from February 19 through March 20, 1998. We request that you take this into consideration in fixing a date for the requested hearing.

Very truly yours,

Michael Best & Friedrich LLP

Donald P. Gallo

Donald P. Gallo

DPG:jxs

cc: Mayor Carol A. Opel (via fax: 524-3899)
Curt R. Meitz, City Attorney (via fax: 524-3888)
Brian S. Barrett, P.E., General Manager (via fax: 521-5265)
Harold H. Fuhrman, Esq. (via fax: 271-1090)
Robert E. Rowland, Ph.D. (via U.S. mail)

r:\xf\client\94148\0014\jxs1349.w52;12/08/97

IN THE CIRCUIT COURT OF WAUKESHA COUNTY

STATE OF WISCONSIN

IN THE MATTER OF THE PRESERVATION OF THE TESTIMONY OF ROBERT ROWLAND, PH.D., J. STEVEN MOORE, M.D., and MARK A. ROBERTS, M.D., PH.D.: CITY OF WAUKESHA, a municipal corporation, d/b/a Waukesha Water Utility, JAMES W. RAPP, and BRUCE ZIVNEY,

Petitioners,

and Case No. 96-CV-2191

STATE OF WISCONSIN, DEPARTMENT OF NATURAL RESOURCES,

Respondent.

Deposition of ROBERT E. ROWLAND, PH.D.

Tuesday, November 26, 1996

10:15 a.m.

at

Harold H. Fuhrman & Associates
710 North Plankinton Avenue
Milwaukee, Wisconsin

Reported by Mary Lorentz

Deposition of ROBERT E. ROWLAND, PH.D., a witness in the above-entitled action, taken at the instance of the Petitioners, pursuant to Chapter 804 of the Wisconsin Statutes, pursuant to Notice, before Mary Lorentz, a Court Reporter and Notary Public in and for the State of Wisconsin, at Harold H. Fuhrman & Associates, 710 North Plankinton Avenue, Milwaukee, Wisconsin, on the 26th day of November, 1996, commencing at 10:15 a.m. and concluding at 12:05 p.m.

A P P E A R A N C E S

HAROLD H. FUHRMAN & ASSOCIATES, by
Mr. Harold H. Fuhrman
710 North Plankinton Avenue, Suite 440
Milwaukee, Wisconsin 53203
Appeared on behalf of the Petitioner,
City of Waukesha d/b/a Waukesha Water Utility

WISCONSIN DEPARTMENT OF JUSTICE, by
Ms. Cynthia R. Hirsch
123 West Washington Avenue
P.O. Box 7857
Madison, Wisconsin 53707
Appeared on behalf of the Respondent

Also Present: Ms. Lisa MacKinnon
Mrs. Emelene Rowland

I N D E X

E X H I B I T S

(Original Exhibits Retained by Attorney Fuhrman)

P R O C E E D I N G S

ROBERT E. ROWLAND, PH.D., called as a witness herein, having been first duly sworn on oath, was examined and testified as follows:

EXAMINATION

BY MR. FUHRMAN:

Q Dr. Rowland, would you state your name, your address and your professional activity?

A Robert E. Roland, and it's R-o-w-l-a-n-d. I live at 700 West Fabyan Parkway, Apartment 8C in Batavia, Illinois. 60510 is the zip code.

As to professional affiliations, I am retired from the Argonne National Laboratory where I was employed for some 30 years. At the Argonne National Laboratory, I retired as associate laboratory director for biology in medicine.

Previous to that I had joined as a young scientist, became an associate scientist, a senior scientist, became director of the scientific -- the division I was in and was asked by the Atomic Energy Commission to form and head up an organization known as the Center for Human Radiobiology, which was charged with the location, measurement and analysis of people in the United States who had been exposed to radium within their body. I subsequently was

promoted to associate laboratory director and retired in 1983.

Subsequent to that date, I have been employed by numerous organizations prime -- as a consultant primarily having to do with radium in the human body and the risks thereof.

Q All right. I draw your attention to Exhibit 1 for identification. You should have it in front of you. Would you state what that is and briefly summarize it?

A This is a curriculum vitae that I prepared, and it's dated 8-94, and for all practical purposes is still quite correct. It indicates my education, Ph.D. at the University of Rochester, 1964, and a master's degree in business administration from the University of Chicago in 1975.

The experience indicates I started out as a meteorologist in World War II, ended up as an air traffic controller. Finished my college education at the Cornell College, and subsequently --

MS. HIRSCH: Mr. Fuhrman, we'll stipulate to his credentials and his expertise.

MR. FUHRMAN: All right.

THE WITNESS: Thank you.

MR. FUHRMAN: You can hand that over to the

reporter. I think probably you might want to -- sure.

BY MR. FUHRMAN:

Q I do have a question in regard to your activities at the Argonne National Laboratory. At one point was all of the studies in regard to radium in human beings consolidated by the various agencies into a unified program?

A The Atomic Energy Commission, which was at that time funding all the work having to do with radium in humans, consolidated about three or four studies at Argonne in an organization called the Center for Human Radiobiology under my direction, and we actually opened the center in 1969, and I was the director of that organization until I was promoted to associate laboratory director in 1981. So during that span, I was responsible for all the studies of radium in individuals in the United States.

Q What is the main -- primary source of information in regard to radium in human beings in terms of case histories?

A Well, the case histories are now in a file that we organized in the Center for Human Radiobiology, and we collected the cases that were studied by our predecessors and brought them all into one location.

We actually added more cases to the file than any other previous organization, and I have, to some extent, summarized those files and those cases in a book I wrote, Radium in Humans.

Q All right. We'll come to that in a few moments.

I show you now Exhibit No. 2 for identification. Would you state what that is?

A Federal Register for July 18th, 1890 -- 1991, which is an Environmental Protection Agency document on national primary drinking water standards.

Q All right. And have you read that document?

A Yes, I have.

Q And you're familiar with the contents?

A Well, I don't have them all memorized, a hundred and some pages, but yes, I am familiar with the contents.

Q Can you briefly summarize the thrust of the proceeding reflected in the notice?

A The -- this document --

Q Well, you have in front of you right now the --

A The cover sheet.

Q -- the cover sheet, and I presume you do have the actual --

MS. HIRSCH: You want to look at my copy?

BY MR. FUHRMAN:

Q I'll give this to you.

A Without even looking at this, I would say that the primary thrust of -- as far as I'm concerned -- of this document is the proposal to raise the maximum contaminant level for the radium isotopes in bone from the then present and now present 5 picocuries per liter combined into a new standard of 20 picocuries of radium 226 per liter of drinking water and up to 20 picocuries of radium 228 per liter of drinking water. As far as I'm concerned, that's the major thrust of this particular document.

Q All right. And I draw your attention to pages 33116 and 33073.

A 33116 and 33073.

Q Right.

A Well, I have located 33073.

Q All right. Reference is made there to a publication written by Rowland, et al. Are you the author of that publication?

A 1978. Yes, I am. I'm the senior author on that publication.

Q And that is the same publication referenced on page 33116?

A Yes, under Rowland somewhere. Here it is. '78. Yes, Dose-Response Relationships.

Q All right. Now, I draw your attention to page 33118

of that EPA notice and in particular to appendix A --

A Um-hum.

Q -- and definition (C), defining curie and picocurie. Would you please read the definitions into the record and tell us whether or not you accept these definitions.

A Curie means a special unit of activity equal to a number of transformations -- transformation, a -- to a nuclear transformation rate of 3.7 times 10 raised to the 10th power disintegrations per second. One picocurie is equal to 10 to the minus 12th curie, which is approximately 2 disintegrations per minute. I will say that I recognize these international definitions.

Q All right. Would you also, if it's possible without making reference to other material, define the term microcurie?

A Microcurie simply means one million of a curie, and actually, numerically, that turns out to be 3.7 times 10 raised to the 4th power disintegrations per second.

Q Thank you. Now, the notice; namely, Exhibit No. 2, scheduled public hearings in connection with the proposed rule-making for September 6, 1991 in Washington, D.C. and September 12, 1991 in Chicago;

is that correct?
A Yes, that's correct.
Q Did you give testimony at each of these public hearings?
A I did that.
Q What did the proposed rule-making encompass as far as radium 226 and radium 228 in drinking water are concerned?
A The proposed maximum contaminant level for radium 226 was set at 20 picocuries per liter for drinking water. The same level was also set for radium 228, 20 picocuries per liter of drinking water.
Q Did you give testimony in support of the new rule-making proposed by the EPA for radium 226 and radium 228?
A At the first hearing held in Washington, D.C., and I believe that's September 6, 1991, I congratulated the Federal EPA for recognizing the unnecessary restrictive picocurie combined level that had been set in 1975 as an interim level, and I concurred with their new proposed level at 20 picocuries per liter for each of the radium isotopes.
Q I show you now Exhibit 3 for identification and ask you to state what that document is.
A This is a transcript of my testimony in Washington,

D.C. on September 6, 1991.

Q I'm not asking you to read it verbatim, but can you summarize briefly what your testimony was?

A I reviewed in this document the studies that were made at Argonne of the people who had radium in their bodies, primarily which they got as a consequence either of medical uses of radium; that is, intravenous injections to cure various diseases, or drinking water that had been spiked with radium, which is purchased from various distributors, or from getting radium in their body as a consequence of working in the so-called radium dial painting plants.

I reviewed the studies we have made of these populations and pointed out that the -- there was no effect visible in anyone at anywhere near levels that they could accumulate in drinking water containing natural radium. Instead we found that there were no effects from radium when a very much higher quantity of radium was taken into the body than could ever be taken in from drinking water.

On that basis I agreed that the levels set were without -- were -- would be characterized as no visible risk to the population of drinking such water.

Q All right. I show you now Exhibit No. 4, for

identification and ask you to tell us what that document is.

A This is my testimony in Chicago on September 12th, 1991. At this time I spoke to a slightly different subject. In addition to proposing maximum contaminant levels for radium in drinking water, they also proposed maximum contaminant level goals, and those goals were set to be zero.

My argument in this paper was that that was an error as far as I was concerned for two reasons:

One, it implied that the radium level in drinking water could be reduced to zero, which I pointed out was not possible.

Secondly, I felt that by the very issuance of such a goal, it was suggesting it was worthwhile to do that, and I felt economically it was not worthwhile to attempt to reduce the radium content of drinking water to zero.

Q I show you now Exhibit No. 5 for identification. Would you state what that is?

A This was a document that I prepared at your request in 1991, as the subject states on the cover, Statement on the Scientific Validity of the Wisconsin Department of Natural Resources Proposed Standards for Maximum Contaminant Level for Radium 226 and

Radium 228.

Q This was prepared in connection with a rule-making that the DNR had conducted in regard to ground water, radium in ground water; is that correct?

A Well, I want to raise a question with you on the ground water part because I will have to confess that this document addressed radium in humans as a consecration of -- as a consequence of acquiring it from drinking water rather than having anything to do with drinking ground water.

Q Well, yes. Is it your understanding that the reason for attempting to control contaminants that might find their way into ground water is in reality to further prevent that rough source of the resource to ultimately get into drinking water?

A I would think so.

Q And so consequently, your comments are relevant therefore?

A I make a distinction in my own mind, which may not fit the spirit and letter of the law, in that the water that we drink in that portion of Illinois, Wisconsin and Iowa that contains high radium levels comes from an aquifer that's located on the average a thousand feet under the surface of the earth, and we colloquially call this a deep-water source.

Colloquially, we in my field consider that's water that's shallow under the surface of the ground is ground water, and actually, it turns out in Illinois, ground water contains much less radium than the deep wells do. So we have concentrated on the deep wells where the radium-containing water comes from.

Obviously, the whole point, however, is to keep the level of radium in the water that we consume at a safe level.

Q And so consequently, that was how you happened to address the --

A This is the spirit of this document, yes.

Q -- the issue of measurement of radium in terms of a health hazard?

A That's right.

Q All right. A copy of that exhibit was also filed with the Radiation Protection Council of the Department of Health and Social Services?

A That was my understanding.

Q All right. Since the time that you gave testimony at the two EPA hearings and filed your written statement with the Wisconsin Department of Natural Resources in 1991, have you continued your studies and research in regard to radium in drinking water?

A I most certainly have.
Q Okay. Did you wish to continue or --
A I was simply going to iterate what I had done in that period.
Q All right.
A I have, one, seen the publication of my book, which I think you have as --
Q As an exhibit?
A -- as an exhibit, Health Effects of -- what is the title -- Radium in Human Bone, yeah -- Radium in Humans: A Review of U.S. Studies. That came out in print in 1994.

Also in 1994, I was invited to attend a meeting on radium and thorium in Germany and to give a paper, and I did that.

And I did subsequently in this past year, September, I was invited to attend a meeting in France on the subject of radiation research and to give a paper again on the effects of radium in humans. So these are the academic activities I have had since that document was prepared in 1991, one book and two invited publications.

Q All right. Let's go back to the book. We had that marked as Exhibit 6 for identification.

MS. HIRSCH: Is this the same thing that --

MR. FUHRMAN: Exactly. You have a paper cover, and this a hard-cover book.

THE WITNESS: Gee, I've never seen the paper cover. I'd like to see that. I understand it's been very hard to get a hold of. You had no trouble?

MS. HIRSCH: Mr. Fuhrman provided me --

THE WITNESS: You had no trouble. You were able to get it?

MR. FUHRMAN: The Water Utility ordered them, and so -- according to one of the fly pages on the book, there is an office maintained by the government where the orders can be placed.

THE WITNESS: I realize that, but I've been contacted by so many people who tell me they can't get copies, and my ears have perked up when you wave that copy.

BY MR. FUHRMAN:

Q This Exhibit 6, is the book that you've made reference to in your earlier testimony?

A Yes, it is.

Q This was commissioned by the Department of Energy; is that correct?

A That's correct.

Q Now, it's published by the University of Chicago.

Would you explain to me the relationship between the University of Chicago, Argonne National Laboratory and the Department of Energy?

A Yes. It's a confusing relationship for many people. Depending upon the agency which has the responsibility at any given time; richly, the Atomic Energy Commission and now the Department of Energy, the national laboratories are all funded by transferring funds for the operation of the laboratory to a manager. In the case of Argonne National Laboratory, the manager is the University of Chicago.

The advantage of that is many fold as far as I as an employee was concerned. One, we were not civil servants. We were hired to do a specific job, and it was -- our performance was evaluated ultimately by the University of Chicago, did we come up to their expectations.

But that is the -- really the significant part of the relationship, a managerial role for the University of Chicago over the national lab, Argonne National Laboratory.

Q Would you state the scope of this book and summarize its contents by making reference to the table of contents appearing on page iii?

A The charge I received from the Department of Energy was to write a history of the work that was done at the Argonne National Laboratory on radium in humans. I started to do that, and I found that this was unsatisfactory.

So I got approval to alter the charge, and the charge was to emphasize the role of Argonne National Laboratory but to include a historical background, how did radium get into people, who were the early people who were studying radium in individuals, what other agencies for a time studied those radium cases before I got to the role that Argonne had in the study of the radium cases, and so that's the way the book turned out, a historical background, then the various studies of radium in humans and then a section on the hazards of radium in the body.

Q Reference is made to the radium watch dial workers, and you earlier in your testimony made reference to them?

A Yes.

Q On a quantitative and qualitative standpoint, what is the significance of that body of --

A We have emphasized the cohort of women who painted watch dials for several reasons:

One, that's the largest body of individuals that

we located and found to study. The reason, of course, is that they worked, they were employed, and when you have employment, you are liable to have employment records. And so that made it relatively easy to find this particular group of people. In many cases the employers eventually made available their -- their list of employees.

They were also useful as a cohort for epidemiological purposes because they were all of one sex. They were all of approximately the same age, 20, plus or minus a couple years. They happened to be all white, simply because of the hiring practices at the time they were employed, and that employment period started approximately 1915 and ran up through the '70s, as far as we can tell. But most of the dial painting took place before and during World War II.

Q Will you explain how these dial painters actually had radium injected into their bodies?

A Well, they -- they acquired radium orally. In the early days of painting, the dial painters were known to apply the paint onto watch dial numerals or on the hand of the watch with a small brush. They would dip the brush into a container of radium-labeled paint, then twirl it in their mouth to bring it to a sharp

point and then do the work that they were to do.

They were paid on a piecework basis, and they found they could paint faster, get more money as a consequence if they kept sharpening the brush with their lips and make a good, fine point.

That practice, however, stopped as far as we can tell, approximately 1925. And while dial painting continued and dial painters continued to get radium in their body, nevertheless, they did not get it in their body at the same rate that the early dial painters did.

One of the remarkable findings of this study was that no one who started painting dials after 1925 when the rules about don't tip the brush with your lips came into effect, no one who started after 1925 ever developed a radium-induced malignancy. All the dial painters that eventually got malignancies started painting before the rule went into effect. So we know they tipped the brush with their mouth and literally ate the paint.

Subsequent dial painters had radium in their body as we -- all the cases we've studied, we measured how much was in their body. All of them -- almost all of them had radium in their bodies, so we know they got it from the air they breathed, but they

never had enough in their body to induce what we call the radium-induced malignancies.

Q And the quantity of radium that the early dial workers acquired, how does that compare to the quantity that is typically found in drinking water?

A Oh, it's more than a million times greater. The early women who painted dials literally ate the paint, and they had so much -- the early painters had so much radium in their body, that they were suffering from a multitude of diseases apparently, but it turned out it was what we called a radiation exposure syndrome. It was as if they had been at Hiroshima and Nagasaki when the bomb dropped.

They received doses of radiation that were so great that the medical people who examined them at the time had no concept of why they were showing the symptoms they did. Many of them died before they could have a malignancy developed. Malignancy takes a certain length of time to develop and show itself as a cancer. Many of these women died too quickly for that simply because the amount of radiation they had in their body was unspeakably large.

But that stopped in 1925, and as I mentioned, no one who started painting after 1925 ever suffered from radium in any way, and I think this is one of

the most outstanding and amazing events, that the very fact to say, Don't tip the brush in your mouth, was enough to clean up the hazards in that particular industry.

Q And in your book, Exhibit 6, you've gone into this in some detail coupled with a compilation of statistics?

A Yes, I've gone into that. We've also discussed in the book the people who received the radium as an intravenous injection from their physicians. Radium was used as a medication in the '20s and 1930s, but by the middle of 1930s, it was pretty well stopped, but up to that time it was still being given by intravenous injection.

And many of the people who got radium from a physician in that fashion, did ultimately develop radium-induced malignancies because quite often they were given a large dose of radium once a week for periods ranging up to a year, and ultimately, they suffered the consequence of that.

We didn't study these people. We -- we documented the individuals that we found, but it's very hard to find people who were given radium by a physician because no physicians were ever willing to give up any records of who they might have injected with radium.

And only one clinic was willing to give us a list of people it had injected, and one state mental institution in Illinois was willing to let us examine the records to see who might have been injected with radium while they were residents at the courtesy of the state, but that had been earlier published in a document, published in, I think, 1933 about work that was done in 1931 in which a small number of patients were given radium intravenously as an attempted cure for schizophrenia.

Q Has there been any peer review of your book?

A There was a book review by a Dr. Gooden, I believe, from Kansas who wrote a very nice review of this book. There were several other reviews, but that's the one that comes to mind.

Q I show you now Exhibit No. 7 for identification and ask you whether this is the --

A Yes.

Q -- review by Dr. Gooden?

A This is Dr. Gooden's review, which this appeared in -- I don't see it here. This appeared in a scientific magazine, scientific publication, I believe, at least it's my impression it did, and I don't see on this document which document it appeared in, which magazine -- the word I should use is

journal, I guess -- which journal it appeared in. But nevertheless, it did appear in a scientific journal, and he seemed to agree with our findings.

Q I show you now what has been marked Exhibit 7 for identification and ask you to tell us what that is.

A That's the one we just -- according to my label here, that's the one I was just discussing --

Q Oh.

A -- review of the book, Radium in Humans, by David Gooden.

Q All right. Let's now go to Exhibit No. 8 for identification.

A Exhibit No. 8 is a Xerox'd copy from the publication that followed the 1994 meeting I was invited to in Germany. Quite often these symposia, the papers that are presented are printed in a symposium volume, and in this case we had no reprints so we had to Xerox the pages out of the document.

Dose-Response Relationships for Female Radium Dial Workers: A New Look, by R.E. Rowland. In this paper I examined the female radium dial workers in terms of the quantity of radium they --

(Brief interruption.)

(Requested portion read.)

THE WITNESS: -- ingested.